Commonwealth of Kentucky
Division for Air Quality

PERMIT STATEMENT OF BASIS

(FINAL)
Conditional Major, Construction / Operating
Permit: F-07-029 R1
Owensboro Specialty Polymers, LLC
Owensboro, KY 42303
2/1/08
Julian D. Breckenridge, Reviewer

SOURCE ID:	21-059-00155
SOURCE A.I. #:	972
ACTIVITY ID:	APE20080001

SOURCE DESCRIPTION:

Owensboro Specialty Polymers, LLC (OSP) owns and operates a batch chemical manufacturing facility in Owensboro, Kentucky. Originally built by the Dewey and Almy Chemical Division of W.R. Grace in 1958, OSP purchased the facility from W.R. Grace & Co. in September 2005. The primary products of OSP are various latex polymers, which fall under the Standard Industrial Classification (SIC) Code 2821 – Plastics Materials and Resins. There are four process groups at the facility: (1) reactor trains, (2) raw material storage tanks, (3) product storage tanks with ancillary piping, and (4) wastewater treatment facilities. Each affected facility/emission point that comprises these process groups have been grouped together for the purposes of presenting the requisite information on emissions and applicable requirements in this application. Generally, the four remaining product lines that draw raw materials from the raw material storage tanks are polymerized in the reactor trains, and the product is then transferred to the product storage tanks to await shipment.

The following is a list and description of the remaining processes at the source:

Emission Point 07: **Acrylic Polymers (DAXAD)**

DAXAD is a poly-methacrylate dispersing agent. DAXAD products are made in a stainless steel reactor by batchwise saponification and subsequent polymerization of methyl methacrylate or methacrylic acid. Regulation 401 KAR 63:020, *Potentially hazardous matter or toxic substances,* applies because of discharge of methyl methacrylate and methanol. DAXAD is normally produced in only one reactor train (Reactor 360 and associated equipment).

Emission Points 08-11, 18: **Polyvinylidene Chloride (DARAN)**

DARAN products are emulsion polymerizations of 1,1-Dichloroethylene with other monomers such as acrylonitrile and various acrylates. Polyvinylidene chloride is made in glass lined or stainless steel reactors by semi-batchwise emulsion polymerization. Regulation 401 KAR 63:020, *Potentially hazardous matter or toxic substances*, applies because of discharge of methyl methacrylate, vinylidene chloride, acrylonitrile, and acrylic acid. DARAN is normally produced in five reactor trains (Reactors 200, 210, 220, 230 and 51 with associated equipment).

Emission Points 12, 14: **Developmental Processes (SPECIALTY (R-1117))**

SPECIALTY (R-1117) is a cationic acrylic polymer emulsion used as a primer or coating for labels and other film applications. Regulation 401 KAR 63:020, *Potentially hazardous matter or toxic substances*, applies because of discharge of Acrylonitrile. SPECIALTY is normally produced in two reactor trains (Reactor 650 and 450 with associated equipment).

Emission Point 13: **Polyvinyl Acetate (PVA)**

PVA products are polyvinyl acetate emulsion polymers. PVA is made in a stainless steel reactor by batchwise and semi-batchwise emulsion polymerization. Regulation 401 KAR 63:020, *Potentially hazardous matter or toxic substances*, applies because of discharge of vinyl acetate and styrene. PVA is normally produced in one reactor train (Reactor 157 with associated equipment).

Emission Point 16: **Raw Material Tank Storage Farm**

The raw materials stored in the tank farm are as follows: ammonia, butyl acrylate, 2-ethyl hexyl acrylate, glacial methacrylic acid, hexylene glycol, methyl acrylate, di-n-butyl maleate, methanol (in 50% and 98% concentrations), methyl methacrylate, vinyl acetate (maintained in a railcar with no emissions) and acrylonitrile. Regulation 401 KAR 63:020, *Potentially hazardous matter or toxic substances*, applies because of discharge of vinyl acetate and methanol.

The year-to-date (YTD) total amount usage of each raw material is generated from the sum of all individual amounts of that raw material used in each batch of each product produced YTD. This YTD total usage figure is then used in the calculation of the Mitchell Scientific's Emission Master Program, version 7.2 to generate the YTD emission amount for each raw material. Extrapolation of the YTD emission provides an estimate of the twelve (12) month total emission from storage of each raw material.

Emission Point 17: **Wastewater Treatment Facility**

OSP runs an activated sludge wastewater treatment facility at the plant and the only emissions are the result of volatilization of materials entrained in the process water.

The emission calculations from the Wastewater Treatment Facility are based upon the methodology reviewed and accepted by the Kentucky Division for Air Quality for the Title V Permit #V-05-053. The calculations are based on the amount of 1,1- dichloroethylene (DCE) discharged with the wastewater in 1996 from a material balance using a 1997 wastewater characterization data table. Specifically, OSP will continue to utilize that characterization data to calculate each raw material constituent in the wastewater by first determining the baseline DCE content (lbs) as a percentage of actual pounds of Polyvinylidene Chloride (PVdC) product (DARAN) produced. This DCE content (lbs) baseline is then divided by the DCE raw material usage amount that was required to produce those actual pounds of DARAN product. This ratio (fraction) then becomes the 'factor' to be multiplied with the actual usage amount of each raw material constituent. The actual usage amount for each raw material constituent entrained in the wastewater. As always, the amount of raw material constituent entrained in the wastewater is assume to be 100% liberated to the atmosphere in the treatment process.

MINOR REVISION FOR F-07-029 R1:

On January 9, 2008 the Division for Air Quality received an application from OSP for a minor revision under Section 14 of 401 KAR 52:030. The request was a change to the Compliance Demonstration Method in Section B on page 3 of Permit # F-07-029. In order to demonstrate compliance for the calculation of emissions from the raw material storage tanks at the facility, OSP was required by the permit to use the United States Environmental Protection Agency's Office of Air Quality Planning and Standards, Emission Factor and Inventory Group's "Tanks" program, version 3.1 or later. The source has been using Emission Master, version 7.2 for many emission calculations. The program has a section with explanations and equations for calculating emissions from storage tanks. Currently, OSP utilizes a Microsoft Access program to calculate the raw material storage tank emissions that was built using the same equations that Emission Master uses. The Microsoft Access Program is tied to the production and inventory systems that provide the necessary storage data to allow the emissions to be calculated in real time. Part a. of the Compliance Demonstration Method will be replaced with the following statement:

> *Emission Master, version 7.2 or other methods approved by the Division for Air Quality shall be used to calculate emissions from the raw material storage tanks.*

The application was completed on January 28, 2008 with no change in the source's emissions inventory.

COMMENTS:

1) Emission Units:

Emission Points	Description	Maximum Hourly Rate (lb/hr)	Emission Factor Basis
07	DAXAD (Reactor Train R-360) Installation Date: 8/1958	352.8 / batch	Engineering Estimate
08	DARAN (Reactor Train R-200) Installation Date: 5/1961	547.7 / batch	
09	DARAN (Reactor Train R-210) Installation Date: 4/1967	618.3 / batch	
10	DARAN (Reactor Train R-220) Installation Date: 7/1985	1197.8 / batch	
11	DARAN (Reactor Train R-230) Installation Date: 6/1958	1151.9 / batch	
18	DARAN (Reactor Train R-51) Installation Date: 6/1958	858.1 / batch	
12	Specialty R-1117 (Reactor Train R-650) Installation Date: 7/1997	195.7 / batch	
14	Specialty R-1117 (Reactor Train R-450) Installation Date: 7/1997	390.8 / batch	
13	PVA (Reactor Train R-157) Installation Date: 5/1969	1182.9 / batch	
16	Raw Materials Tank Farm Installation Date: 1/1959	0.2800	
17	Wastewater Treatment Tank System Installation Date: 1/1999	0.8920	

Table 2. Summary of all emission points, descriptions, rated capacities, and emission factor basis

The major emissions from these processes are VOC and HAP emissions. These processes are not subject to best available control technology (BACT) or maximum achievable control technology (MACT).

Emission Factors and Emissions Calculations:
Potential emissions from the production of DAXAD, DARAN, PVA and SPECIALTY are calculated based on a "Super Batch". The Super Batch approach is used to calculate the emissions from all the different process areas throughout the facility. Each product family has several different specific products, which in the production process emit different levels of the same pollutants. Each product family's Super Batch was constructed using the highest emission rate (in lbs/batch) of each particular pollutant among all the specific products throughout the product family. Potentials to emit were calculated by dividing 8760 hours/year by the product batch cycle time, then multiplying by the highest emission rate of each pollutant. This method is both conservative and flexible.

Emission Concentrations for Pollutants of Concern:
To meet the provisions of 401 KAR 63:020, *Potentially hazardous matter or toxic substances* source-wide emissions should not produce emission concentrations at the site perimeter exceeding:

Methanol:	620 micrograms/cubic meter
Methyl methacrylate:	980 micrograms/cubic meter
Vinylidene chloride:	32 micrograms/cubic meter
Acrylonitrile:	2 micrograms/cubic meter
Acrylic acid:	1 microgram/cubic meter
Vinyl acetate:	200 micrograms/cubic meter
Styrene:	1000 micrograms/cubic meter

These pollutants are limited to the Reference Exposure Concentrations (RfC) derived by the U. S. EPA for these chemicals, or, in the case of chemicals for which the U. S. EPA has not developed an RfC; they are limited to the California Air Resources Board Reference Exposure Level. The Industrial Source Complex Short Term 3 (ISCST 3) modeling algorithm is accepted to demonstrate compliance with these limits. No emission limitations are listed in this permit because OSP has demonstrated compliance with this regulation using the Industrial Source Complex Short Term 3 (ISCST 3) modeling algorithm to calculate emission concentrations.

NOTE: An RfC is "An estimate, derived by the U. S. EPA…of a daily exposure to the human population…that is likely to be without appreciable risk of deleterious effects during a lifetime of exposure."

Control Equipment:
There is no required control equipment for these processes.

EMISSION AND OPERATING CAPS DESCRIPTION:

OSP has applied to operate under federally enforceable permit limits of less than 90 tons per year of VOC, less than 9.5 and 23.75 tons per year of single and combined HAPs, respectively.

PERIODIC MONITORING:

Refer to permit F-07-029 for specific monitoring.

OPERATIONAL FLEXIBILITY:

This permit does not preclude OSP from cross-utilizing reactors or other equipment as business dictates. However, if a product is made using equipment not specifically described for that product in the permit, OSP must keep a record of how many batches of what products are made in which reactor trains. For each product, no matter which reactor train is used in its manufacture, all federally required air pollution control equipment must be used.

All finished product storage tanks are insignificant sources of pollutants. They are identified in the permit according to the products that they customarily contain. This does not preclude OSP from storing other products in the tanks to meet market requirements, as long as the tank and emissions still meet the requirements to be an insignificant activity.

CREDIBLE EVIDENCE:

This permit contains provisions, which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has only adopted the provisions of 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12 into its air quality regulations.